



FY 2004 President's Request

Improve Weather Forecast Accuracy through THORPEX

Addresses

NOAA Mission Goal #3

Serve society's needs for weather and water information

What is requested?

An increase of \$2.5 million is requested for NOAA's U.S. Weather Research program (USWRP), including the NOAA-wide High Impact Weather initiative. Of this money, NOAA requests an increase of \$1.3 million to support The Observing System Research and Predictability Experiment (THORPEX), an emerging component of the USWRP that will significantly improve weather forecast accuracy.

Why do we need it?

Increased forecast accuracy is especially needed to improve the prediction of the location, lead-time and intensity of severe thunderstorms, tornadoes and hurricanes. Significant improvements in predictability are possible on all time scales, especially short range (two to three days), medium range (three to seven days) and the week-two forecast (seven to 14 days). The improved predictability will be valuable to many service sectors, including energy, transportation, and tourism industries that require high accuracy in temperature information, cloud cover, humidity and other basic meteorological variables.

New sensing technology, data assimilation techniques, and numerical modeling techniques, especially ensemble predictions, are expected to improve forecast accuracy. Most nations recognize the need for similar improvements in their forecast services; however, high expenses make it difficult for countries to upgrade their systems. To overcome cost problems, the World Weather Research Programme (WWRP) initiated THORPEX as an international program of research. Principal sponsorship for the program comes from Australia, Canada, China, France, Germany, India, Japan, Korea, United Kingdom, US, Russia, and the European Commission. The US program is being developed under the auspices of the USWRP, with principal sponsorship from NOAA, the National Science Foundation, the National Aeronautic and Space Administration, and the Department of Defense (Navy).

THORPEX At-a-Glance

What: \$1.3 M increase
Why: Improving weather and forecast accuracy will result in saved lives and reduced property damage

Office of Oceanic & Atmospheric Research, Weather and Air Quality Research, U.S. Weather Research Program



What will we do?

The goals of THORPEX include: extending the limit of predictability from the current seven days to two weeks, and doubling the rate of improvements in forecast skill by 2012 (e.g., the skill with 7-day forecasts will equal that of today's 5-day forecast). The forecast improvements will be achieved through advances in predictability theory, data assimilation and the understanding of dynamical processes. These advances will be used to design a dynamically controlled numerical weather prediction system, which will lead to better ensemble perturbations and predictions of the location of sensitive observing zones. (Ensemble perturbations combine several forecasts into one through a weighted average, and therefore are less sensitive to errors in analysis and model.) Also, the program will develop a diverse range of in situ observing technologies to supplement satellite data in cloudy sensitive regions and in remote areas.

Several pre-THORPEX activities began in FY 2001 and continue through FY 2002 and FY2003. The activities include the development and testing of a driftsonde balloon capability and the testing of Aerosondes (UAVs). THORPEX will build on NORPEX, an aircraft reconnaissance program that collected data for the North Pacific. NORPEX showed promising improvements in predictability using targeted observations in critical regions for storm development over the ocean.

What are the benefits?

THORPEX will fundamentally and significantly improve all aspects of global and regional atmospheric predictability in the three- to 14-day range. The project will concentrate on improvements in predictions of the most societal relevant parameters of wind, temperature, and precipitation. The benefits of THORPEX will span the entire \$2.7 billion weather sensitive sector of the US Gross Domestic Product. THORPEX will improve the prediction of winter storms, which cost the US economy in excess of \$1 billion annually. In addition, THORPEX will concentrate on the improvement of temperature forecasts for the energy sector. A one-degree improvement in temperature forecasts across the country with a three- to five-day lead-time is estimated to save the energy sector about \$1 billion annually. In order to maximize the benefits and utility of the program, the societal impact component of THORPEX will gather feedback from various economic sectors concerning their forecasting responses and needs.

For more
information:

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THORPEX

The Observing System
Research and
Predictability Experiment



NOAA Budget
FY 2004
Change

Office of Oceanic and Atmospheric Research
Weather and Air Quality Research
U.S. Weather Research Program

THORPEX \$1.3M